

Low-Sulfate Seawater Injection into Oil Reservoir to Avoid Scaling Problem

Amer Badr Bin Merdiah and Abu Azam Mohd Yassin

Faculty of Chemical and Natural Resources, Engineering Universiti Teknologi Malaysia,
81310 Skudai, Johor, Malaysia

Abstract: This study presents the results of laboratory experiments carried out to investigate the formation of calcium, strontium and barium sulfates from mixing Angsi seawater or low sulfate seawater with the following sulfate contents (75, 50, 25, 5 and 1%) and formation water contain high concentration of calcium, strontium and barium ions at various temperatures (40-90°C) and atmospheric pressure. The knowledge of solubility of common oil field scale formation and how their solubilities are affected by changes in salinity and temperatures is also studied. Results show a large of precipitation occurred in all jars containing seawater while the amount of precipitation decreased when the low sulfate seawater was used. At higher temperatures the mass of precipitation of CaSO_4 and SrSO_4 scales increases and the mass of precipitation of BaSO_4 scale decreases since the solubilities of CaSO_4 and SrSO_4 scales decreases and the solubility of BaSO_4 increases with increasing temperature. It can be concluded that even at sulfate content of 1% there may still be a scaling problem.

Key words: Scaling problems, low sulfate seawater, high salinity, high barium, temperature

Corresponding Author: Amer Badr Bin Merdiah, Faculty of Chemical and Natural Resources,
Engineering Universiti Teknologi Malaysia, 81310 Skudai, Johor, Malaysia